

Thyristor Modules

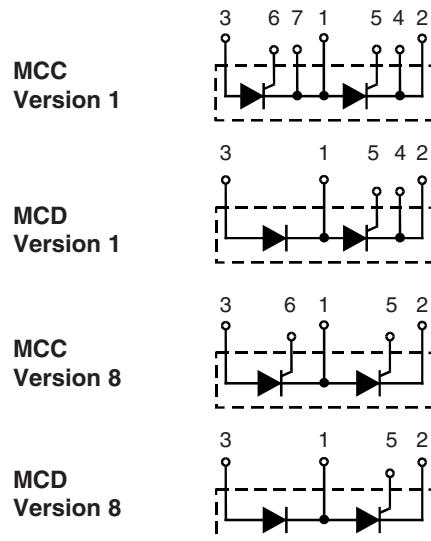
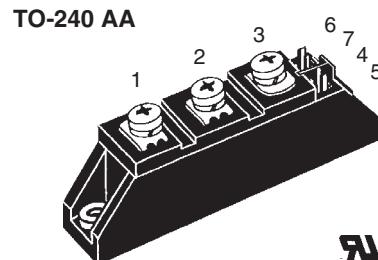
Thyristor/Diode Modules

I_{TRMS} = 2x180 A
I_{TAVM} = 2x116 A
V_{RRM} = 800-1800 V

V _{RSM} V _{DSM}	V _{RRM} V _{DRM}	Type	Version	1 B	8 B	Version	1 B	8 B
900	800	MCC 95-08	io1 B / io8 B			MCD 95-08	io1 B / io8 B	
1300	1200	MCC 95-12	io1 B / io8 B			MCD 95-12	io1 B / io8 B	
1500	1400	MCC 95-14	io1 B / io8 B			MCD 95-14	io1 B / io8 B	
1700	1600	MCC 95-16	io1 B / io8 B			MCD 95-16	io1 B / io8 B	
1900	1800	MCC 95-18	io1 B / io8 B			MCD 95-18	io1 B / io8 B	

Symbol	Conditions	Maximum Ratings		
I _{TRMS} , I _{FRMS}	T _{VJ} = T _{VJM}	180	A	
I _{TAVM} , I _{FAVM}	T _C = 85°C; 180° sine	116	A	
I _{TSM} , I _{FSM}	T _{VJ} = 45°C	t = 10 ms (50 Hz), sine	2250	A
	V _R = 0	t = 8.3 ms (60 Hz), sine	2400	A
	T _{VJ} = T _{VJM}	t = 10 ms (50 Hz), sine	2000	A
	V _R = 0	t = 8.3 ms (60 Hz), sine	2150	A
Ji ² dt	T _{VJ} = 45°C	t = 10 ms (50 Hz), sine	25 300	A ² s
	V _R = 0	t = 8.3 ms (60 Hz), sine	23 900	A ² s
	T _{VJ} = T _{VJM}	t = 10 ms (50 Hz), sine	20 000	A ² s
	V _R = 0	t = 8.3 ms (60 Hz), sine	19 100	A ² s
(di/dt) _{cr}	T _{VJ} = T _{VJM} ; f = 50 Hz; t _p = 200 µs V _D = 2/3 V _{DRM} ;	repetitive, I _T = 250 A	150	A/µs
	I _G = 0.45 A; di _g /dt = 0.45 A/µs	non repetitive, I _T = I _{TAVM}	500	A/µs
(dv/dt) _{cr}	T _{VJ} = T _{VJM} ; R _{GR} = ∞; method 1 (linear voltage rise)	V _{DR} = 2/3 V _{DRM}	1000	V/µs
P _{GM}	T _{VJ} = T _{VJM} ; I _T = I _{TAVM} ;	t _p = 30 µs t _p = 300 µs	10 5	W W
P _{GAV}			0.5	W
V _{RGM}			10	V
T _{VJ}			-40...+125	°C
T _{VJM}			125	°C
T _{stg}			-40...+125	°C
V _{ISOL}	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA;	t = 1 min t = 1 s	3000 3600	V~
M _d	Mounting torque (M5) Terminal connection torque (M5)		2.5-4.0/22-35 Nm/lb.in. 2.5-4.0/22-35 Nm/lb.in.	
Weight	Typical including screws		90	g

Data according to IEC 60747 and refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions



Features

- International standard package, JEDEC TO-240 AA
- Direct copper bonded Al₂O₃ -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 95873
- Gate-cathode twin pins for version 1

Applications

- DC motor control
- Softstart AC motor controller
- Light, heat and temperature control

Advantages

- Space and weight savings
- Simple mounting with two screws
- Improved temperature and power cycling
- Reduced protection circuits

Symbol	Conditions	Characteristic Values		
I_{RRM}, I_{DRM}	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	5	mA	
V_T, V_F	$I_T/I_F = 300 \text{ A}; T_{VJ} = 25^\circ\text{C}$	1.5	V	
V_{TO}	For power-loss calculations only ($T_{VJ} = 125^\circ\text{C}$)	0.8	V	
r_T		2.4	$\text{m}\Omega$	
V_{GT}	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = -40^\circ\text{C}$	2.5	V	
I_{GT}	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = -40^\circ\text{C}$	150	mA	
		200	mA	
V_{GD}	$T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$	0.2	V	
I_{GD}		10	mA	
I_L	$T_{VJ} = 25^\circ\text{C}; t_p = 10 \mu\text{s}; V_D = 6 \text{ V}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	450	mA	
I_H	$T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; R_{GK} = \infty$	200	mA	
t_{gd}	$T_{VJ} = 25^\circ\text{C}; V_D = \frac{1}{2} V_{DRM}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	2	μs	
t_q	$T_{VJ} = T_{VJM}; I_T = 150 \text{ A}, t_p = 200 \mu\text{s}; -di/dt = 10 \text{ A}/\mu\text{s}$ $V_R = 100 \text{ V}; dv/dt = 20 \text{ V}/\mu\text{s}; V_D = \frac{2}{3} V_{DRM}$	typ.	185	μs
Q_S	$T_{VJ} = T_{VJM}; I_T/I_F = 50 \text{ A}, -di/dt = 6 \text{ A}/\mu\text{s}$	170	μC	
I_{RM}		45	A	
R_{thJC}	per thyristor/diode; DC current	other values see Fig. 8/9	0.22	K/W
	per module		0.11	K/W
R_{thJK}	per thyristor/diode; DC current		0.42	K/W
	per module		0.21	K/W
d_s	Creepage distance on surface	12.7	mm	
d_A	Strike distance through air	9.6	mm	
a	Maximum allowable acceleration	50	m/s^2	

Optional accessories for module-type MCC 95 version 1 B
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **ZY 200L** (L = Left for pin pair 4/5) } UL 758, style 1385,
Type **ZY 200R** (R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

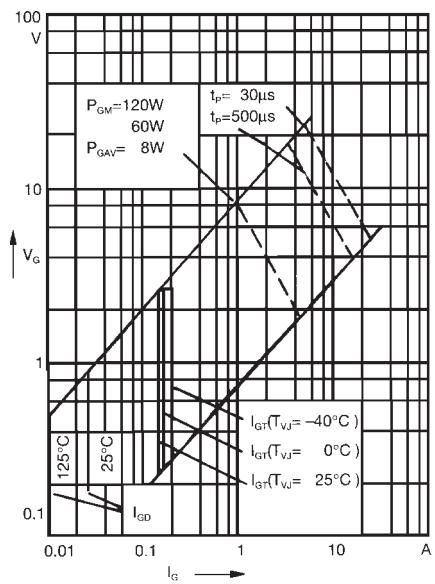


Fig. 1 Gate trigger characteristics

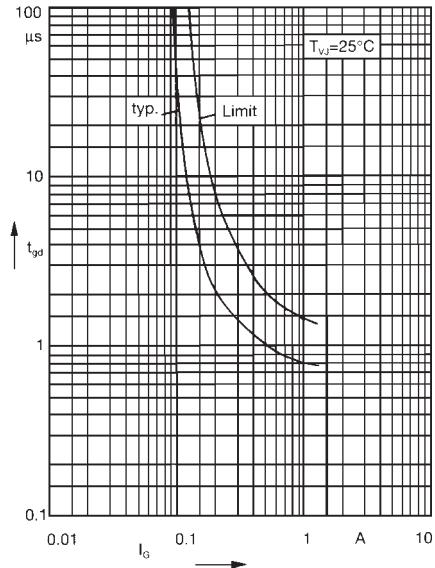
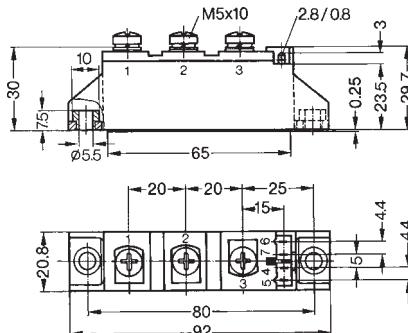


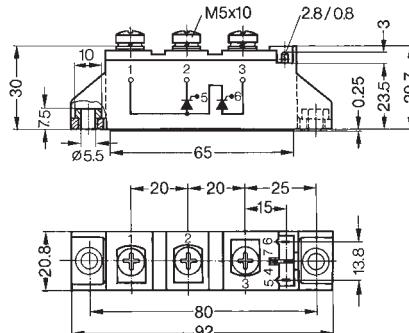
Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

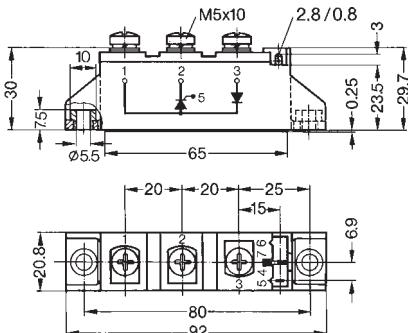
MCC / MCD Version 1 B



MCC Version 8 B



MCD Version 8 B



Version 1 or 8 without B in typ designation = without insert in mounting holes

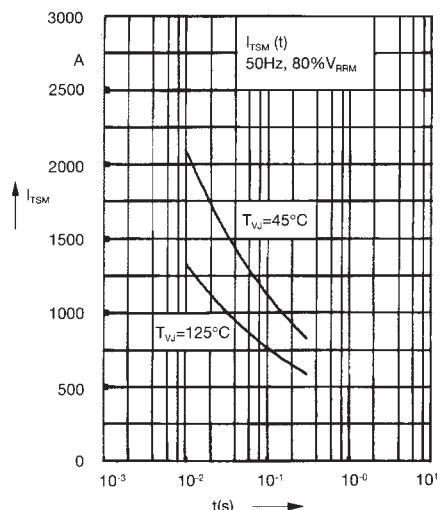


Fig. 3 Surge overload current
 I_{TSM}, I_{FSM} : Crest value, t: duration

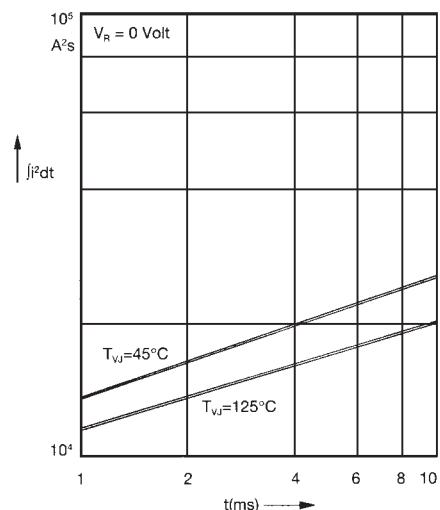


Fig. 4 $\int j^2 dt$ versus time (1-10 ms)

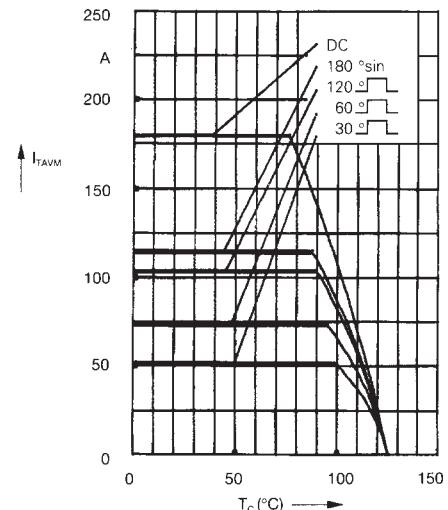


Fig. 4a Maximum forward current at case temperature

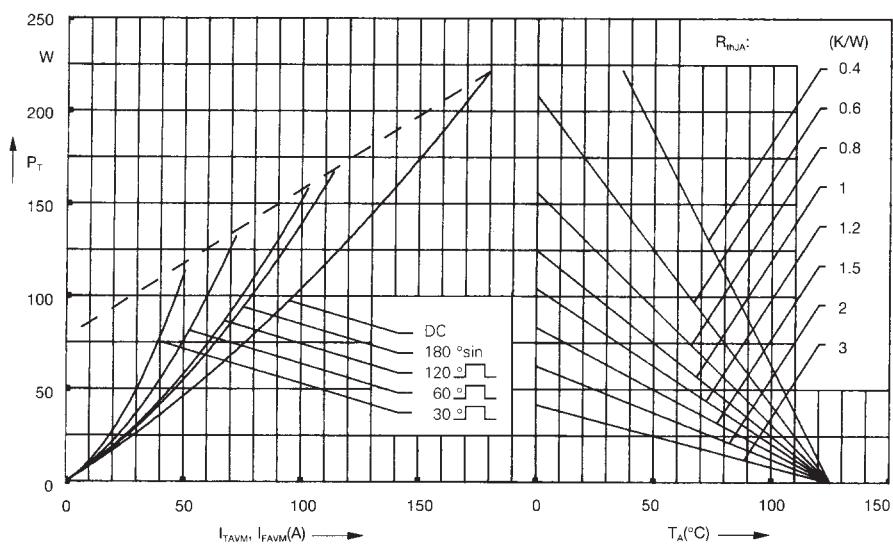


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

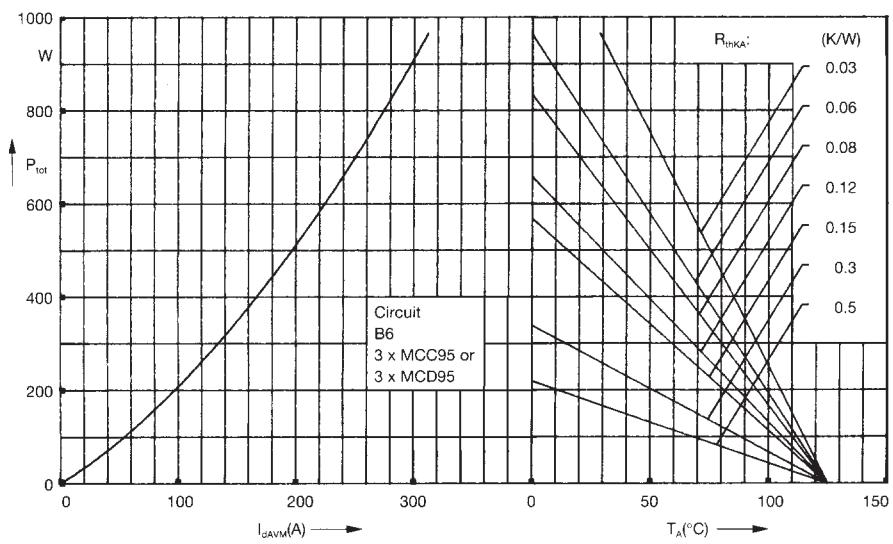
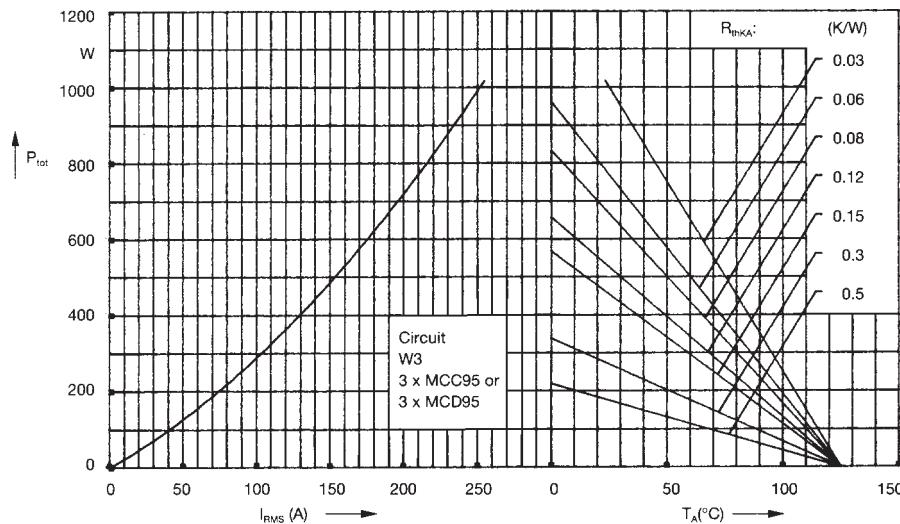
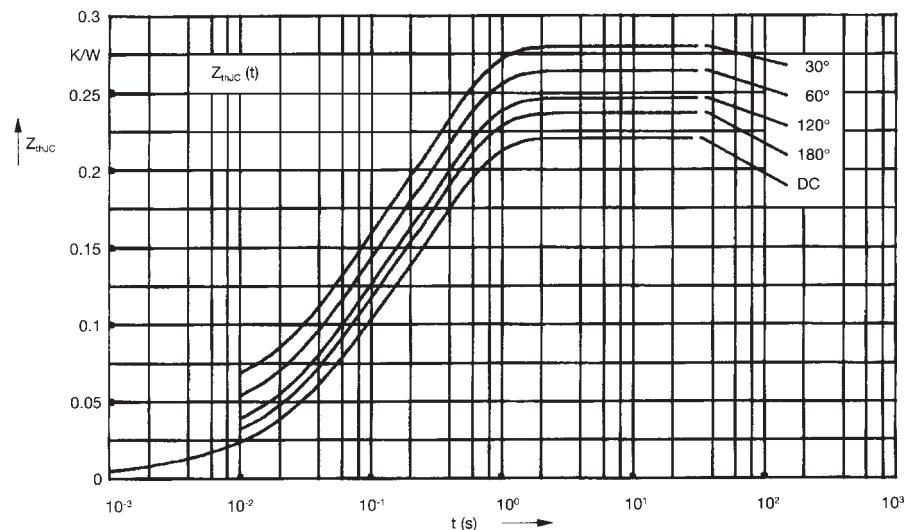


Fig. 6 Three phase rectifier bridge:
Power dissipation versus direct output current and ambient temperature



**Fig. 7 Three phase AC-controller:
Power dissipation versus RMS
output current and ambient
temperature**



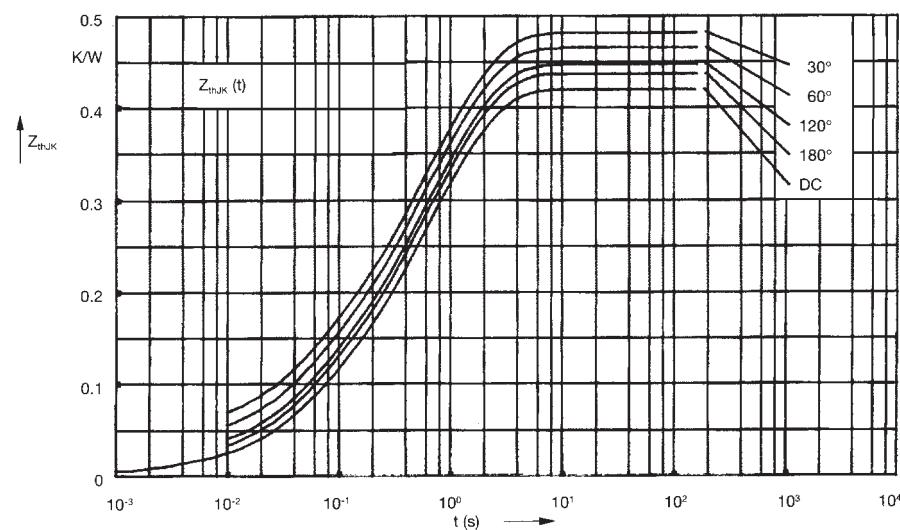
**Fig. 8 Transient thermal impedance
junction to case (per thyristor or
diode)**

R_{thJC} for various conduction angles d :

d	R_{thJC} (K/W)
DC	0.22
180°	0.23
120°	0.25
60°	0.27
30°	0.28

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344



**Fig. 9 Transient thermal impedance
junction to heatsink (per thyristor or
diode)**

R_{thJK} for various conduction angles d :

d	R_{thJK} (K/W)
DC	0.42
180°	0.43
120°	0.45
60°	0.47
30°	0.48

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344
4	0.2	1.32